

**RELIABILITY MONITOR REPORT  
FOR**

**TSSOP Package**

**Dallas Semiconductor**

**4401 South Beltwood Parkway  
Dallas, TX 75244-3292**

**This Report was prepared by  
Dallas Semiconductor Reliability Engineering**

**Summary:**

The data in the tables that follow was generated as the result of an on-going Package Reliability Monitor. The assemblies covered by this package monitor are:

ASSY SITE	PINS	PACKAGE		
ATK (Amkor, K)	14	TSSOP	ATK (Amkor, K)	16 TSSOP
ATK (Amkor, K)	20	TSSOP	ATK (Amkor, K)	24 TSSOP
ATP (Amkor, PI)	14	TSSOP	ATP (Amkor, PI)	16 TSSOP
ATP (Amkor, PI)	20	TSSOP	ATP (Amkor, PI)	24 TSSOP
ATP (Amkor, PI)	28	TSSOP	ATP (Amkor, PI)	8 TSSOP
ATP (Amkor, PI)	16	TSSOP & Bump Resistor	ATP (Amkor, PI)	8 TSSOP & Bump Resistor
Carsem	14	TSSOP	Carsem	16 TSSOP
Carsem	20	TSSOP	Carsem	24 TSSOP
Carsem	28	TSSOP	Carsem	8 TSSOP
Carsem	14	TSSOP & Bump Resistor	Carsem	16 TSSOP & Bump Resistor
Carsem	20	TSSOP & Bump Resistor	Carsem	8 TSSOP & Bump Resistor
OSEP	14	TSSOP	OSEP	16 TSSOP
OSEP	20	TSSOP	OSEP	24 TSSOP
OSEP	28	TSSOP		

The calculated failure rate for this assembly is:

**FAILURE RATE:                      MTTF (YRS): 70832                      FITS: 1.6**

The parameters used to calculate this failure rate are as follows:

**Cf: 60%                      Ea: 0.7                      B: 0                      Tu: 25 °C                      Vu: 5.5 Volts**

The reliability data follows. At the start of this data is a description of the assembly vehicle used to generate this reliability data. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available. This report covers data between 1/1/04 and 12/31/04 .

**Assembly Information:**

Package Type:                      TSSOP 4.4 mm  
 Flammability:                      UL 94-V0  
 Moisture Sensitivity                      Level 1  
 (JEDEC J-STD20A)  
 Date Code Range:                      0350                      to                      0442

**MOISTURE SENSITIVITY LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0405	DS2770	J-STD-020		8	0	
STORAGE LIFE			125C	24 HRS	8	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	8	0	
CONVECTION REFLOW			235C +/-0C	3 PASS	8	0	
EXTERNAL VISUAL			J-STD-020, 6.1a		8	0	
PRECONDITION U/S			J-STD-020		8	0	
ULTRASOUND	0426	DS2770	J-STD-020		8	0	
STORAGE LIFE			125C	24 HRS	8	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	8	0	
CONVECTION REFLOW			235C +/-0C	3 PASS	8	0	
EXTERNAL VISUAL			J-STD-020, 6.1a		8	0	
PRECONDITION U/S			J-STD-020		8	0	
ULTRASOUND	0427	DS2770	J-STD-020		8	0	

STORAGE LIFE	0427	DS2770	125C	24	HRS	8	0
MOISTURE SOAK			85 C/85% R.H.	168	HRS	8	0
EXTERNAL VISUAL			J-STD-020, 6.1a			8	0
PRECONDITION U/S			J-STD-020			8	0
<b>Total:</b>						<b>0</b>	<b>0</b>

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### OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0350	DS1870	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0357	DS1267	125C, 5.5 V, -4.0V	1000 HRS	80	0	
HIGH TEMP OP LIFE	0403	DS1318	125C, 3.6 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0405	DS2770	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0408	DS1267	125C, 5.5 V, -4.0V	1000 HRS	80	0	
HIGH TEMP OP LIFE	0417	DS2761	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0418	DS4520	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0424	DS1848	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0425	DS4077C	125C, 3.6V (PSA) & -4.0V (PSB)	1000 HRS	45	0	
HIGH TEMP OP LIFE	0426	DS2770	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0427	DS2770	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0437	DS2751	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0439	DS1859	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0440	DS13Q10	125C, 3.6 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0440	DS4550	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0442	DS2780	125C, 5.5 VOLTS	500 HRS	77	0	
<b>Total:</b>						<b>0</b>	<b>0</b>

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### PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY	0405	DS2770	JESD22-B102		3	0	
X-RAY	0405	DS2770	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS			JESD22-B100		6	0	
MARK PERMANENCY			JESD22-B107		6	0	
LEAD INTEGRITY			JESD22-B105 TEST CONDITION B		6	0	
SOLDERABILITY	0426	DS2770	JESD22-B102		3	0	
X-RAY	0426	DS2770	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS			JESD22-B100		6	0	
MARK PERMANENCY			JESD22-B107		6	0	
LEAD INTEGRITY			JESD22-B105 TEST CONDITION B		6	0	
SOLDERABILITY	0427	DS2770	JESD22-B102		3	0	
X-RAY	0427	DS2770	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS			JESD22-B100		6	0	
MARK PERMANENCY			JESD22-B107		6	0	
LEAD INTEGRITY			JESD22-B105 TEST CONDITION B		6	0	
<b>Total:</b>						<b>0</b>	<b>0</b>

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**PRECONDITIONING LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0357	DS1267	J-STD-020		4	0	
STORAGE LIFE	0357	DS1267	125C	24 HRS	241		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	241		
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0357	DS1267	J-STD-020		4	0	
STORAGE LIFE	0405	DS2770	125C	24 HRS	353	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	353	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	353	0	
ULTRASOUND	0408	DS1267	J-STD-020		4	0	
STORAGE LIFE	0408	DS1267	125C	24 HRS	241		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	241		
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0408	DS1267	J-STD-020		4	0	
STORAGE LIFE	0426	DS2770	125C	24 HRS	353	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	353	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	353	0	
STORAGE LIFE	0427	DS2770	125C	24 HRS	353	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	353	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	353	0	
ULTRASOUND	0431	DS1267	J-STD-020		241	0	
STORAGE LIFE	0431	DS1267	125C	24 HRS	241		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	241		
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
					<b>Total:</b>	<b>0</b>	

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**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0405	DS2770	150C	1000 HRS	77	0	
STORAGE LIFE	0417	DS2761	150C	1000 HRS	77	0	
STORAGE LIFE	0425	DS4077C	150C	1000 HRS	77	0	
STORAGE LIFE	0426	DS2770	150C	1000 HRS	77	0	
STORAGE LIFE	0427	DS2770	150C	1000 HRS	77	0	
					<b>Total:</b>	<b>0</b>	

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**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0357	DS1267	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0405	DS2770	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0408	DS1267	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0417	DS2761	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0426	DS2770	-55C TO 125C	1000 CYS	77	0	

TEMP CYCLE	0427	DS2770	-55C TO 125C	1000 CYS	77	0
TEMP CYCLE	0437	DS2751	-55C TO 125C	1000 CYS	77	0
TEMP CYCLE	0439	DS1859	-55C TO 125C	1000 CYS	77	0
TEMP CYCLE	0442	DS2780	-55C TO 125C	1000 CYS	77	0
<b>Total:</b>						<b>0</b>

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**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE	0357	DS1267	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0405	DS2770	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0408	DS1267	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0426	DS2770	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0427	DS2770	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0437	DS2751	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0439	DS1859	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0442	DS2780	85/85, 5.5 VOLTS	1000 HRS	77	0	
<b>Total:</b>						<b>0</b>	

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**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0357	DS1267	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0405	DS2770	121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
AUTOCLAVE	0408	DS1267	121C, 2 ATM STEAM, UNBIASED	168 HRS	40	0	
MOISTURE SOAK	0417	DS2761	85 C/85% R.H.	1000 HRS	77	0	
AUTOCLAVE	0426	DS2770	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0427	DS2770	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0437	DS2751	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0439	DS1859	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0442	DS2780	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**FAILURE RATE:                    MTTF (YRS): 70832                    FITS: 1.6**